

1923534_1
SEQUENCE LISTING

<110> Lysando AG
<120> Modified KZ144 endolysin sequence
<130> LYS-021 PCT 1
<150> PCT/EP2013/073869
<151> 2013-11-14
<160> 152
<170> PatentIn version 3.5
<210> 1
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 <223> Xaa can be any naturally occurring amino acid, in particular leucine or threonine

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 <223> Xaa can be any naturally occurring amino acid, in particular isoleucine or leucine

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 <223> Xaa can be any naturally occurring amino acid, in particular serine or threonine

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Xaa Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Xaa Gln Leu
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Gln Thr Leu Leu₂₀ Asn Leu Xaa Gly Tyr₂₅ Asp Val Gly Lys Pro₃₀ Asp Gly
Ile Phe Gly₃₅ Asn Asn Thr Phe Asn₄₀ Gln Val Val Lys Phe₄₅ Gln Lys Asp
Asn Xaa₅₀ Leu Asp Ser Asp Gly₅₅ Ile Val Gly Lys Asn₆₀ Thr Trp Ala Glu
Leu Phe₆₅ Ser Lys Tyr Ser₇₀ Pro Pro Ile Pro Tyr₇₅ Lys Thr Ile Pro Met₈₀
Pro Xaa Ala Asn Lys₈₅ Ser Arg Ala Ala₉₀ Thr Pro Val Met Asn₉₅ Ala
Val Glu Asn Ala₁₀₀ Thr Gly Val Arg Ser₁₀₅ Gln Leu Leu Leu Thr₁₁₀ Phe Ala
Ser Ile Glu₁₁₅ Ser Ala Phe Asp Tyr₁₂₀ Glu Xaa Lys Ala Lys₁₂₅ Thr Ser Ser
Ala Thr₁₃₀ Gly Trp Phe Gln Phe₁₃₅ Leu Thr Gly Thr Trp₁₄₀ Lys Thr Met Ile
Glu Asn Tyr Gly Xaa Lys₁₅₀ Tyr Gly Val Xaa Thr₁₅₅ Asp Pro Thr Gly Xaa₁₆₀
Leu Arg Lys Asp Pro₁₆₅ Arg Xaa Ser Ala Leu Met Gly Ala Glu Leu₁₇₅ Ile
Lys Glu Xaa Xaa₁₈₀ Asn Ile Leu Arg Pro₁₈₅ Xaa Leu Lys Arg Glu₁₉₀ Pro Thr
Asp Thr Asp₁₉₅ Leu Tyr Leu Ala His₂₀₀ Phe Phe Gly Pro Gly₂₀₅ Xaa Ala Arg
Arg Phe₂₁₀ Leu Xaa Thr Gly Gln Asn Glu Leu Ala Ala₂₂₀ Thr His Phe Xaa
Lys Glu Ala Gln Ala Xaa₂₃₀ Pro Xaa Ile Phe Tyr₂₃₅ Asn Lys Asp Gly Ser₂₄₀
Pro Lys Thr Ile Gln₂₄₅ Glu Val Tyr Asn Leu Met Asp Gly Lys Val₂₅₅ Ala
Ala His Arg Lys₂₆₀

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<223> KZ144 endolysin without N-terminal methionine

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Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 65 70 75 80

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
 115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
 145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
 195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 210 215 220

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210>	3
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Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
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60

50

55

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Xaa Pro
65 70 75 80

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Xaa Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Xaa Ile Glu
130 135 140

Asn Tyr Gly Xaa Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Xaa Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Xaa Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Xaa Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 4
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Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
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Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Ala Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

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Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
 20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
 35 40 45

Asn Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
 50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
 65 70 75 80

Pro Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
 85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
 100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser
 115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
 130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
 145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
 165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
 180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg
 195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
 210 215 220

1923534_1

Lys Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

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<223> mutated KZ144 with C14S and C50S

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Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
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180

185

190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg
 195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
 210 215 220

Lys Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser
 225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
 245 250 255

Ala His Arg Lys
 260

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Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
 20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
 35 40 45

Asn Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
 50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
 65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
 85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
 100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser
 115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
 130 135 140

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Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

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Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala

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100

105

110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
 115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
 130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
 145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
 165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
 180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
 195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
 210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
 225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
 245 250 255

Ala His Arg Lys
 260

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Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
 20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
 35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
 50 55 60

1923534_1

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

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<223> mutated KZ144 with C14S, C23S and C50S

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Gln Thr Leu Leu Asn Leu Ser Gly Tyr Asp Val Gly Lys Pro Asp Gly

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20

25

30

Ile Phe Gly₃₅ Asn Asn Thr Phe Asn₄₀ Gln Val Val Lys Phe₄₅ Gln Lys Asp
 Asn Ser₅₀ Leu Asp Ser Asp Gly₅₅ Ile Val Gly Lys Asn₆₀ Thr Trp Ala Glu
 Leu Phe Ser Lys Tyr Ser₇₀ Pro Pro Ile Pro Tyr₇₅ Lys Thr Ile Pro Met₈₀
 Pro Thr Ala Asn Lys₈₅ Ser Arg Ala Ala Ala₉₀ Thr Pro Val Met Asn₉₅ Ala
 Val Glu Asn Ala₁₀₀ Thr Gly Val Arg Ser₁₀₅ Gln Leu Leu Leu Thr₁₁₀ Phe Ala
 Ser Ile Glu₁₁₅ Ser Ala Phe Asp Tyr₁₂₀ Glu Ile Lys Ala Lys₁₂₅ Thr Ser Ser
 Ala Thr Gly Trp Phe Gln Phe₁₃₅ Leu Thr Gly Thr Trp₁₄₀ Lys Thr Met Ile
 Glu₁₄₅ Asn Tyr Gly Met Lys₁₅₀ Tyr Gly Val Leu Thr₁₅₅ Asp Pro Thr Gly Ala₁₆₀
 Leu Arg Lys Asp Pro₁₆₅ Arg Ile Ser Ala Leu₁₇₀ Met Gly Ala Glu Leu₁₇₅ Ile
 Lys Glu Asn Met₁₈₀ Asn Ile Leu Arg Pro₁₈₅ Val Leu Lys Arg Glu₁₉₀ Pro Thr
 Asp Thr Asp₁₉₅ Leu Tyr Leu Ala His₂₀₀ Phe Phe Gly Pro Gly₂₀₅ Ala Ala Arg
 Arg Phe₂₁₀ Leu Thr Thr Gly Gln₂₁₅ Asn Glu Leu Ala Ala₂₂₀ Thr His Phe Pro
 Lys Glu Ala Gln Ala Asn₂₃₀ Pro Ser Ile Phe Tyr₂₃₅ Asn Lys Asp Gly Ser₂₄₀
 Pro Lys Thr Ile Gln₂₄₅ Glu Val Tyr Asn Leu₂₅₀ Met Asp Gly Lys Val₂₅₅ Ala
 Ala His Arg Lys₂₆₀

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1923534_1

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20 25 30Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

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Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Asn Ala Arg
195 200 205

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Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

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and C50S

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Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160

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Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Tyr Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 14
<211> 260
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with M180E, T82I, A206V, S232T, I122M, A160T, C14S
and C50S

<400> 14

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
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115

120

125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
 130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
 145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
 165 170 175

Lys Glu Asn Glu Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
 180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
 195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
 210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
 225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
 245 250 255

Ala His Arg Lys
 260

<210> 15
 <211> 260
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with M149P, T82I, A206V, S232T, I122M, A160T, C14S
 and C50S

<400> 15

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu
 1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
 20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
 35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
 50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
 65 70 75 80

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Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 16

<211> 260

<212> PRT

<213> Artificial Sequence

<220>

<223> mutated KZ144 with V186Y, T82I, A206V, S232T, I122M, A160T, C14S
and C50S

<400> 16

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

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Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Tyr Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 17
<211> 260
<212> PRT
<213> Artificial sequence

<220>
<223> mutated KZ144 with T82I, A206V, S232T, I122M, A160T, C14R and
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C50S

<400> 17

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 18
<211> 260
<212> PRT
<213> Artificial Sequence

<220>
<223> mutated KZ144 with T82I, A206V, S232T, I122M, C14S and C50S

<400> 18

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

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Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 19
<211> 260
<212> PRT
<213> Artificial Sequence

<220>
<223> mutated KZ144 with T82I, A206V, S232T, I122M, A160T, C14S and C50N

<400> 19

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

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Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 20
<211> 260
<212> PRT
<213> Artificial Sequence

<220>
<223> mutated KZ144 with C14R, C50S, T82I, I122M, M149P, A206V and S232T

<400> 20

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

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Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
 130 135 140

Glu Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
 145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
 165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
 180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
 195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
 210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
 225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
 245 250 255

Ala His Arg Lys
 260

<210> 21
 <211> 260
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> mutated KZ144 with C14R, C50S, T82I, I122M, M149P, A160T, A206V
 and S232T

<400> 21

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
 1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
 20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
 35 40 45

Asn Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
 50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
 65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
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Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 22
<211> 260
<212> PRT
<213> Artificial Sequence

<220>
<223> mutated KZ144 with T82I, I122M, M149P, A206V, S232T, C14R and C50N

<400> 22

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

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Asn 50 Asn 50 Leu Asp Ser Asp 55 Gly 55 Ile Val Gly Lys 60 Asn 60 Thr Trp Ala Glu
 Leu 65 Phe Ser Lys Tyr 70 Ser 70 Pro Pro Ile Pro 75 Tyr 75 Lys Thr Ile Pro 80 Met 80
 Pro Ile Ala Asn 85 Lys 85 Ser Arg Ala Ala 90 Ala 90 Thr Pro Val Met 95 Asn 95 Ala
 Val Glu Asn 100 Ala 100 Thr Gly Val Arg 105 Ser 105 Gln Leu Leu Leu 110 Thr 110 Phe Ala
 Ser Ile 115 Glu 115 Ser Ala Phe Asp 120 Tyr 120 Glu Met Lys Ala 125 Lys 125 Thr Ser Ser
 Ala 130 Thr 130 Gly Trp Phe Gln 135 Phe 135 Leu Thr Gly Thr 140 Trp 140 Lys Thr Met Ile
 Glu 145 Asn 145 Tyr Gly Pro 150 Lys 150 Tyr Gly Val Leu 155 Thr 155 Asp Pro Thr Gly Ala 160
 Leu Arg Lys Asp 165 Pro 165 Arg Ile Ser Ala 170 Leu 170 Met Gly Ala Glu 175 Leu 175 Ile
 Lys Glu Asn 180 Met 180 Asn Ile Leu Arg 185 Pro 185 Val Leu Lys Arg 190 Glu 190 Pro Thr
 Asp Thr 195 Asp 195 Leu Tyr Leu Ala 200 His 200 Phe Phe Gly Pro 205 Gly 205 Val Ala Arg
 Arg 210 Phe 210 Leu Thr Thr Gly 215 Gln 215 Asn Glu Leu Ala 220 Ala 220 Thr His Phe Pro
 Lys 225 Glu 225 Ala Gln Ala 230 Asn 230 Pro Thr Ile Phe 235 Tyr 235 Asn Lys Asp Gly Ser 240
 Pro Lys Thr Ile 245 Gln 245 Glu Val Tyr Asn 250 Leu 250 Met Asp Gly Lys 255 Val 255 Ala
 Ala His Arg Lys 260

<210> 23
 <211> 260
 <212> PRT
 <213> Artificial sequence

<220>
 <223> mutated KZ144 with T82I, I122M, M149P, I167L, A206V, S232T, C14R and C50N

<400> 23

1923534_1

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
145 150 155 160

Leu Arg Lys Asp Pro Arg Leu Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

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<210> 24
 <211> 260
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> mutated KZ144 with T82I, I122M, M149P, N179F, A206V, S232T, C14R and C50N

<400> 24

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
 1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
 20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
 35 40 45

Asn Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
 50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
 65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
 85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
 100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
 115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
 130 135 140

Glu Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
 145 150 155 160

Leu Arg Lys Asp Pro Arg Leu Ser Ala Leu Met Gly Ala Glu Leu Ile
 165 170 175

Lys Glu Phe Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
 180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
 195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
 210 215 220

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Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
 225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
 245 250 255

Ala His Arg Lys
 260

<210> 25

<211> 260

<212> PRT

<213> Artificial Sequence

<220>

<223> mutated KZ144 with T82I, I122M, M149P, A206V, T212N, S232T, C14R and C50N

<400> 25

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
 1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
 20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
 35 40 45

Asn Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
 50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
 65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
 85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
 100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
 115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
 130 135 140

Glu Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
 145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
 165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
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185

190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
 195 200 205

Arg Phe Leu Asn Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
 210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
 225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
 245 250 255

Ala His Arg Lys
 260

<210> 26
 <211> 260
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> mutated KZ144 with T82I, I122M, M149P, A206V, P224Q, S232T, C14R
 and C50N

<400> 26

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
 1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
 20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
 35 40 45

Asn Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
 50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
 65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
 85 90 95

Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
 100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
 115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
 130 135 140

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Glu Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Gln
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 27
<211> 260
<212> PRT
<213> Artificial Sequence

<220>
<223> mutated KZ144 with T82I, I122M, M149P, L154T, A206V, S232T, C14R
and C50N

<400> 27

Met Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu
1 5 10 15

Gln Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly
20 25 30

Ile Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp
35 40 45

Asn Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu
50 55 60

Leu Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met
65 70 75 80

Pro Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala
85 90 95

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Val Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala
100 105 110

Ser Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser
115 120 125

Ala Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile
130 135 140

Glu Asn Tyr Gly Pro Lys Tyr Gly Val Thr Thr Asp Pro Thr Gly Ala
145 150 155 160

Leu Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile
165 170 175

Lys Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr
180 185 190

Asp Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg
195 200 205

Arg Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro
210 215 220

Lys Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser
225 230 235 240

Pro Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala
245 250 255

Ala His Arg Lys
260

<210> 28
<211> 259
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with C14S and C50S, without N-terminal methionine
<400> 28

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
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1923534_1
60

50

55

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 29

<211> 259

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with T82I, A206V and S232, without N-terminal methionine

<400> 29

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
1 5 10 15

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Thr Leu Leu Asn₂₀ Leu Cys Gly Tyr Asp₂₅ Val Gly Lys Pro Asp₃₀ Gly Ile
Phe Gly Asn₃₅ Asn Thr Phe Asn₄₀ Gln Val Val Lys Phe₄₅ Gln Lys Asp Asn
Cys Leu Asp Ser Asp Gly Ile₅₅ Val Gly Lys Asn₆₀ Thr Trp Ala Glu Leu
Phe Ser Lys Tyr Ser Pro₇₀ Pro Ile Pro Tyr Lys₇₅ Thr Ile Pro Met Pro₈₀
Ile Ala Asn Lys Ser₈₅ Arg Ala Ala Ala Thr₉₀ Pro Val Met Asn₉₅ Ala Val
Glu Asn Ala Thr₁₀₀ Gly Val Arg Ser Gln₁₀₅ Leu Leu Leu Thr Phe₁₁₀ Ala Ser
Ile Glu Ser₁₁₅ Ala Phe Asp Tyr Glu₁₂₀ Ile Lys Ala Lys Thr₁₂₅ Ser Ser Ala
Thr Gly₁₃₀ Trp Phe Gln Phe Leu₁₃₅ Thr Gly Thr Trp Lys₁₄₀ Thr Met Ile Glu
Asn Tyr Gly Met Lys Tyr₁₅₀ Gly Val Leu Thr Asp₁₅₅ Pro Thr Gly Ala Leu₁₆₀
Arg Lys Asp Pro Arg₁₆₅ Ile Ser Ala Leu Met₁₇₀ Gly Ala Glu Leu Ile₁₇₅ Lys
Glu Asn Met Asn₁₈₀ Ile Leu Arg Pro Val₁₈₅ Leu Lys Arg Glu Pro₁₉₀ Thr Asp
Thr Asp Leu₁₉₅ Tyr Leu Ala His Phe₂₀₀ Phe Gly Pro Gly Val₂₀₅ Ala Arg Arg
Phe Leu Thr Thr Gly Gln Asn₂₁₅ Glu Leu Ala Ala Thr₂₂₀ His Phe Pro Lys
Glu Ala Gln Ala Asn Pro₂₃₀ Thr Ile Phe Tyr Asn₂₃₅ Lys Asp Gly Ser Pro₂₄₀
Lys Thr Ile Gln Glu₂₄₅ Val Tyr Asn Leu Met₂₅₀ Asp Gly Lys Val Ala₂₅₅ Ala
His Arg Lys

<210> 30
<211> 259

1923534_1

<212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with T82I, A206V, S232T, I122M and A160T, without N-terminal methionine

<400> 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
 1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
 145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
 195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 225 230 235 240

1923534_1

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 31
<211> 259
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with C14S, C50S, I122M and A160T, without
N-terminal methionine

<400> 31

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

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Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
 195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 210 215 220

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 245 250 255

His Arg Lys

<210> 32

<211> 259

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with C14S, C23S and C50S, without N-terminal methionine

<400> 32

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
 1 5 10 15

Thr Leu Leu Asn Leu Ser Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 65 70 75 80

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
 115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
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145				150				155				160			
Arg	Lys	Asp	Pro	Arg 165	Ile	Ser	Ala	Leu	Met 170	Gly	Ala	Glu	Leu	Ile 175	Lys
Glu	Asn	Met	Asn 180	Ile	Leu	Arg	Pro	Val 185	Leu	Lys	Arg	Glu	Pro 190	Thr	Asp
Thr	Asp	Leu 195	Tyr	Leu	Ala	His	Phe 200	Phe	Gly	Pro	Gly	Ala 205	Ala	Arg	Arg
Phe	Leu 210	Thr	Thr	Gly	Gln	Asn 215	Glu	Leu	Ala	Ala	Thr 220	His	Phe	Pro	Lys
Glu 225	Ala	Gln	Ala	Asn	Pro 230	Ser	Ile	Phe	Tyr	Asn 235	Lys	Asp	Gly	Ser	Pro 240
Lys	Thr	Ile	Gln	Glu 245	Val	Tyr	Asn	Leu	Met 250	Asp	Gly	Lys	Val	Ala 255	Ala
His	Arg	Lys													

Lys 1	Val	Leu	Arg	Lys 5	Gly	Asp	Arg	Gly	Asp 10	Glu	Val	Ser	Gln	Leu 15	Gln
Thr	Leu	Leu	Asn 20	Leu	Cys	Gly	Tyr	Asp 25	Val	Gly	Lys	Pro	Asp 30	Gly	Ile
Phe	Gly	Asn 35	Asn	Thr	Phe	Asn	Gln 40	Val	Val	Lys	Phe	Gln 45	Lys	Asp	Asn
Ser	Leu 50	Asp	Ser	Asp	Gly	Ile 55	Val	Gly	Lys	Asn	Thr 60	Trp	Ala	Glu	Leu
Phe 65	Ser	Lys	Tyr	Ser	Pro 70	Pro	Ile	Pro	Tyr	Lys 75	Thr	Ile	Pro	Met	Pro 80
Ile	Ala	Asn	Lys	Ser 85	Arg	Ala	Ala	Ala	Thr 90	Pro	Val	Met	Asn	Ala 95	Val
Glu	Asn	Ala	Thr 100	Gly	Val	Arg	Ser	Gln 105	Leu	Leu	Leu	Thr	Phe 110	Ala	Ser

1923534_1

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 34
<211> 259
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with T82I, A206N, S232T, I122M, A160T, C14S and C50S, without N-terminal methionine

<400> 34

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

1923534_1

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Asn Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 35

<211> 259

<212> PRT

<213> Artificial Sequence

<220>

<223> mutated KZ144 with N230Y, T82I, A206V, S232T, I122M, A160T, C14S and C50S, without N-terminal methionine

<400> 35

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
1 5 10 15

1923534_1

Thr Leu Leu Asn₂₀ Leu Cys Gly Tyr Asp₂₅ Val Gly Lys Pro Asp₃₀ Gly Ile

Phe Gly Asn₃₅ Asn Thr Phe Asn₄₀ Gln Val Val Lys Phe₄₅ Gln Lys Asp Asn

Ser Leu₅₀ Asp Ser Asp Gly Ile₅₅ Val Gly Lys Asn Thr₆₀ Trp Ala Glu Leu

Phe Ser Lys Tyr Ser Pro₇₀ Pro Ile Pro Tyr Lys₇₅ Thr Ile Pro Met Pro₈₀

Ile Ala Asn Lys Ser₈₅ Arg Ala Ala Ala Thr₉₀ Pro Val Met Asn Ala₉₅ Val

Glu Asn Ala Thr₁₀₀ Gly Val Arg Ser Gln₁₀₅ Leu Leu Leu Thr Phe₁₁₀ Ala Ser

Ile Glu Ser₁₁₅ Ala Phe Asp Tyr Glu₁₂₀ Met Lys Ala Lys Thr₁₂₅ Ser Ser Ala

Thr Gly₁₃₀ Trp Phe Gln Phe Leu₁₃₅ Thr Gly Thr Trp Lys₁₄₀ Thr Met Ile Glu

Asn Tyr Gly Met Lys Tyr₁₅₀ Gly Val Leu Thr Asp₁₅₅ Pro Thr Gly Thr Leu₁₆₀

Arg Lys Asp Pro Arg₁₆₅ Ile Ser Ala Leu Met₁₇₀ Gly Ala Glu Leu Ile₁₇₅ Lys

Glu Asn Met Asn₁₈₀ Ile Leu Arg Pro Val₁₈₅ Leu Lys Arg Glu Pro₁₉₀ Thr Asp

Thr Asp Leu₁₉₅ Tyr Leu Ala His Phe₂₀₀ Phe Gly Pro Gly Val₂₀₅ Ala Arg Arg

Phe Leu₂₁₀ Thr Thr Gly Gln Asn₂₁₅ Glu Leu Ala Ala Thr₂₂₀ His Phe Pro Lys

Glu Ala Gln Ala Tyr Pro₂₃₀ Thr Ile Phe Tyr Asn₂₃₅ Lys Asp Gly Ser Pro₂₄₀

Lys Thr Ile Gln Glu₂₄₅ Val Tyr Asn Leu Met₂₅₀ Asp Gly Lys Val Ala₂₅₅ Ala

His Arg Lys

<210> 36
 <211> 259
 <212> PRT
 <213> Artificial sequence

1923534_1

<220>

<223> mutated KZ144 with M180E, T82I, A206V, S232T, I122M, A160T, C14S and C50S, without N-terminal methionine

<400> 36

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Glu Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala

His Arg Lys

<210> 37
 <211> 259
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> mutated KZ144 with M149P, T82I, A206V, S232T, I122M, A160T, C14S and C50S, without N-terminal methionine

<400> 37

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
 1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 130 135 140

Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
 145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
 195 200 205

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Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 38

<211> 259

<212> PRT

<213> Artificial Sequence

<220>

<223> mutated KZ144 with V186Y, T82I, A206V, S232T, I122M, A160T, C14S and C50S, without N-terminal methionine

<400> 38

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
145 150 155 160

1923534_1

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Tyr Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 39

<211> 259

<212> PRT

<213> Artificial sequence

<220>

<223> mutated KZ144 with T82I, A206V, S232T, I122M, A160T, C14R and C50S, without N-terminal methionine

<400> 39

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

1923534_1

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 40
<211> 259
<212> PRT
<213> Artificial Sequence

<220>
<223> mutated KZ144 with T82I, A206V, S232T, I122M, C14S and C50S,
without N-terminal methionine

<400> 40

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
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Phe Gly Asn₃₅ Asn Thr Phe Asn Gln₄₀ Val Val Lys Phe Gln₄₅ Lys Asp Asn
 Asn Leu₅₀ Asp Ser Asp Gly Ile₅₅ Val Gly Lys Asn Thr₆₀ Trp Ala Glu Leu
 Phe Ser Lys Tyr Ser Pro₇₀ Pro Ile Pro Tyr Lys₇₅ Thr Ile Pro Met Pro₈₀
 Ile Ala Asn Lys Ser₈₅ Arg Ala Ala Ala Thr₉₀ Pro Val Met Asn Ala₉₅ Val
 Glu Asn Ala Thr₁₀₀ Gly Val Arg Ser Gln₁₀₅ Leu Leu Leu Thr Phe₁₁₀ Ala Ser
 Ile Glu Ser₁₁₅ Ala Phe Asp Tyr Glu₁₂₀ Met Lys Ala Lys Thr₁₂₅ Ser Ser Ala
 Thr Gly₁₃₀ Trp Phe Gln Phe Leu₁₃₅ Thr Gly Thr Trp Lys₁₄₀ Thr Met Ile Glu
 Asn Tyr Gly Met Lys Tyr₁₅₀ Gly Val Leu Thr Asp₁₅₅ Pro Thr Gly Thr Leu₁₆₀
 Arg Lys Asp Pro Arg₁₆₅ Ile Ser Ala Leu Met₁₇₀ Gly Ala Glu Leu Ile₁₇₅ Lys
 Glu Asn Met Asn₁₈₀ Ile Leu Arg Pro Val₁₈₅ Leu Lys Arg Glu Pro₁₉₀ Thr Asp
 Thr Asp Leu₁₉₅ Tyr Leu Ala His Phe₂₀₀ Phe Gly Pro Gly Val₂₀₅ Ala Arg Arg
 Phe Leu₂₁₀ Thr Thr Gly Gln Asn₂₁₅ Glu Leu Ala Ala Thr₂₂₀ His Phe Pro Lys
 Glu Ala Gln Ala Asn Pro₂₃₀ Thr Ile Phe Tyr Asn₂₃₅ Lys Asp Gly Ser Pro₂₄₀
 Lys Thr Ile Gln Glu₂₄₅ Val Tyr Asn Leu Met₂₅₀ Asp Gly Lys Val Ala₂₅₅ Ala

His Arg Lys

<210> 42
 <211> 259
 <212> PRT
 <213> Artificial Sequence

<220>

1923534_1

<223> mutated KZ144 with C14R, C50S, T82I, I122M, M149P, A206V and S232T; without N-terminal methionine

<400> 42

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 43
 <211> 259
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> mutated KZ144 with C14R, C50S, T82I, I122M, M149P, A160T, A206V
 and S232T; without N-terminal methionine

<400> 43

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
 1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 130 135 140

Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
 145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
 195 200 205

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Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 245 250 255

His Arg Lys

<210> 44

<211> 259

<212> PRT

<213> Artificial Sequence

<220>

<223> mutated KZ144 with T82I, I122M, M149P, A206V, S232T, C14R and C50N, without N-terminal methionine

<400> 44

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
 1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 130 135 140

Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
 145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys

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165

170

175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
 195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 245 250 255

His Arg Lys

<210> 45

<211> 259

<212> PRT

<213> Artificial Sequence

<220>

<223> mutated KZ144 with T82I, I122M, M149P, I167L, A206V, S232T, C14R
 and C50N, without N-terminal methionine

<400> 45

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
 1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 115 120 125

1923534_1

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
145 150 155 160

Arg Lys Asp Pro Arg Leu Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 46

<211> 259

<212> PRT

<213> Artificial Sequence

<220>

<223> mutated KZ144 with T82I, I122M, M149P, N179F, A206V, S232T, C14R
and C50N, without N-terminal methionine

<400> 46

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

1923534_1

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
145 150 155 160

Arg Lys Asp Pro Arg Leu Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Phe Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 47

<211> 259

<212> PRT

<213> Artificial Sequence

<220>

<223> mutated KZ144 with T82I, I122M, M149P, A206V, T212N, S232T, C14R
and C50N, without N-terminal methionine

<400> 47

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

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Phe Gly Asn₃₅ Asn Thr Phe Asn Gln₄₀ Val Val Lys Phe Gln₄₅ Lys Asp Asn
 Asn Leu₅₀ Asp Ser Asp Gly Ile₅₅ Val Gly Lys Asn Thr₆₀ Trp Ala Glu Leu
 Phe Ser Lys Tyr Ser Pro₇₀ Pro Ile Pro Tyr Lys₇₅ Thr Ile Pro Met Pro₈₀
 Ile Ala Asn Lys Ser₈₅ Arg Ala Ala Ala Thr₉₀ Pro Val Met Asn Ala₉₅ Val
 Glu Asn Ala Thr₁₀₀ Gly Val Arg Ser Gln₁₀₅ Leu Leu Leu Thr Phe₁₁₀ Ala Ser
 Ile Glu Ser₁₁₅ Ala Phe Asp Tyr Glu₁₂₀ Met Lys Ala Lys Thr₁₂₅ Ser Ser Ala
 Thr Gly₁₃₀ Trp Phe Gln Phe Leu₁₃₅ Thr Gly Thr Trp Lys₁₄₀ Thr Met Ile Glu
 Asn Tyr Gly Pro Lys Tyr₁₅₀ Gly Val Leu Thr Asp₁₅₅ Pro Thr Gly Ala Leu₁₆₀
 Arg Lys Asp Pro Arg₁₆₅ Ile Ser Ala Leu Met₁₇₀ Gly Ala Glu Leu Ile₁₇₅ Lys
 Glu Asn Met Asn₁₈₀ Ile Leu Arg Pro Val₁₈₅ Leu Lys Arg Glu Pro₁₉₀ Thr Asp
 Thr Asp Leu₁₉₅ Tyr Leu Ala His Phe₂₀₀ Phe Gly Pro Gly Val₂₀₅ Ala Arg Arg
 Phe Leu₂₁₀ Asn Thr Gly Gln Asn₂₁₅ Glu Leu Ala Ala Thr₂₂₀ His Phe Pro Lys
 Glu Ala Gln Ala Asn Pro₂₃₀ Thr Ile Phe Tyr Asn₂₃₅ Lys Asp Gly Ser Pro₂₄₀
 Lys Thr Ile Gln Glu₂₄₅ Val Tyr Asn Leu Met₂₅₀ Asp Gly Lys Val Ala₂₅₅ Ala

His Arg Lys

<210> 48
 <211> 259
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> mutated KZ144 with T82I, I122M, M149P, A206V, P224Q, S232T, C14R
 and C50N, without N-terminal methionine

<400> 48

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
35 40 45

Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
130 135 140

Asn Tyr Gly Pro Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Gln Lys
210 215 220

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 49
 <211> 259
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> mutated KZ144 with T82I, I122M, M149P, L154T, A206V, S232T, C14R
 and C50N, without N-terminal methionine

<400> 49

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Arg Gln Leu Gln
 1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Asn Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 65 70 75 80

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 115 120 125

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 130 135 140

Asn Tyr Gly Pro Lys Tyr Gly Val Thr Thr Asp Pro Thr Gly Ala Leu
 145 150 155 160

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 165 170 175

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 180 185 190

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
 195 200 205

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 210 215 220

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Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
225 230 235 240

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
245 250 255

His Arg Lys

<210> 50
<211> 6
<212> PRT
<213> artificial

<220>
<223> synthetic sequence

<400> 50

Lys Arg Lys Lys Arg Lys
1 5

<210> 51
<211> 5
<212> PRT
<213> artificial

<220>
<223> synethtic sequence

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 51

Lys Arg Xaa Lys Arg
1 5

<210> 52
<211> 5
<212> PRT
<213> artificial

<220>
<223> synthetic sequence

<400> 52

Lys Arg Ser Lys Arg
1 5

<210> 53
<211> 5
<212> PRT
<213> artificial

<220>

<223> synthetic sequence

<400> 53

Lys Arg Gly Ser Gly
1 5

<210> 54

<211> 9

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 54

Lys Arg Lys Lys Arg Lys Lys Arg Lys
1 5

<210> 55

<211> 9

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 55

Arg Arg Arg Arg Arg Arg Arg Arg Arg
1 5

<210> 56

<211> 8

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 56

Lys Lys Lys Lys Lys Lys Lys Lys
1 5

<210> 57

<211> 10

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 57

Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys
1 5 10

<210> 58

<211> 12

<212> PRT

<213> artificial

1923534_1

<220>
<223> synthetic sequence

<400> 58

Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys
1 5 10

<210> 59
<211> 14
<212> PRT
<213> artificial

<220>
<223> synthetic sequence

<400> 59

Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg
1 5 10

<210> 60
<211> 16
<212> PRT
<213> artificial

<220>
<223> synthetic sequence

<400> 60

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
1 5 10 15

<210> 61
<211> 18
<212> PRT
<213> artificial

<220>
<223> synthetic sequence

<400> 61

Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys
1 5 10 15

Arg Lys

<210> 62
<211> 19
<212> PRT
<213> artificial

<220>
<223> synthetic sequence

<400> 62

Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys
1 5 10 15

Arg Lys Lys

<210> 63
 <211> 19
 <212> PRT
 <213> artificial
 <220>
 <223> synthetic sequence
 <400> 63

Arg Arg Arg Arg Arg Arg Arg Arg Arg Arg Arg Arg Arg Arg Arg Arg
 1 5 10 15

Arg Arg Arg

<210> 64
 <211> 19
 <212> PRT
 <213> artificial
 <220>
 <223> synthetic sequence
 <400> 64

Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys Lys
 1 5 10 15

Lys Lys Lys

<210> 65
 <211> 20
 <212> PRT
 <213> artificial
 <220>
 <223> synthetic sequence
 <400> 65

Lys Arg Lys Lys Arg Lys Lys Arg Lys Arg Ser Lys Arg Lys Lys Arg
 1 5 10 15

Lys Lys Arg Lys
 20

<210> 66
 <211> 21
 <212> PRT
 <213> artificial
 <220>
 <223> synthetic sequence

1923534_1

<400> 66

Lys Arg Lys Lys Arg Lys Lys Arg Lys Arg Ser Lys Arg Lys Lys Arg
1 5 10 15

Lys Lys Arg Lys Lys
20

<210> 67

<211> 21

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 67

Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys
1 5 10 15

Arg Lys Lys Arg Lys
20

<210> 68

<211> 22

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 68

Lys Arg Lys Lys Arg Lys Lys Arg Lys Arg Gly Ser Gly Lys Arg Lys
1 5 10 15

Lys Arg Lys Lys Arg Lys
20

<210> 69

<211> 24

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 69

Lys Arg Lys Lys Arg Lys Lys Arg Lys Arg Gly Ser Gly Ser Gly Lys
1 5 10 15

Arg Lys Lys Arg Lys Lys Arg Lys
20

<210> 70

<211> 25

<212> PRT

<213> artificial

1923534_1

<220>

<223> synthetic sequence

<400> 70

Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys
1 5 10 15

Arg Lys Lys Arg Lys Lys Arg Lys Lys
20 25

<210> 71

<211> 31

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 71

Lys Arg Lys Lys Arg Lys Lys Arg Lys Arg Ser Lys Arg Lys Lys Arg
1 5 10 15

Lys Lys Arg Lys Arg Ser Lys Arg Lys Lys Arg Lys Lys Arg Lys
20 25 30

<210> 72

<211> 38

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 72

Lys Arg Lys Lys Arg Lys Lys Arg Lys Arg Gly Ser Gly Ser Gly Lys
1 5 10 15

Arg Lys Lys Arg Lys Lys Arg Lys Gly Ser Gly Ser Gly Lys Arg Lys
20 25 30

Lys Arg Lys Lys Arg Lys
35

<210> 73

<211> 39

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 73

Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys
1 5 10 15

1923534_1

Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg Lys Lys Arg
20 25 30

Lys Lys Arg Lys Lys Arg Lys
35

<210> 74
<211> 42
<212> PRT
<213> artificial

<220>
<223> synthetic sequence

<400> 74

Lys Arg Lys Lys Arg Lys Lys Arg Lys Arg Ser Lys Arg Lys Lys Arg
1 5 10 15

Lys Lys Arg Lys Arg Ser Lys Arg Lys Lys Arg Lys Lys Arg Lys Arg
20 25 30

Ser Lys Arg Lys Lys Arg Lys Lys Arg Lys
35 40

<210> 75
<211> 37
<212> PRT
<213> Homo sapiens

<400> 75

Leu Leu Gly Asp Phe Phe Arg Lys Ser Lys Glu Lys Ile Gly Lys Glu
1 5 10 15

Phe Lys Arg Ile Val Gln Arg Ile Lys Asp Phe Leu Arg Asn Leu Val
20 25 30

Pro Arg Thr Glu Ser
35

<210> 76
<211> 29
<212> PRT
<213> unknown

<220>
<223> SMAP-29 sheep

<400> 76

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly
20 25

<210> 77

1923534_1

<211> 13
<212> PRT
<213> unknown

<220>
<223> Indolicidine bovine

<400> 77

Ile Leu Pro Trp Lys Trp Pro Trp Trp Pro Trp Arg Arg
1 5 10

<210> 78
<211> 18
<212> PRT
<213> unknown

<220>
<223> Protegrin Porcine

<400> 78

Arg Gly Gly Arg Leu Cys Tyr Cys Arg Arg Arg Phe Cys Val Cys Val
1 5 10 15

Gly Arg

<210> 79
<211> 31
<212> PRT
<213> unknown

<220>
<223> Cecropin P1 Mammal (pig)

<400> 79

Ser Trp Leu Ser Lys Thr Ala Lys Lys Leu Glu Asn Ser Ala Lys Lys
1 5 10 15

Arg Ile Ser Glu Gly Ile Ala Ile Ala Ile Gln Gly Gly Pro Arg
20 25 30

<210> 80
<211> 23
<212> PRT
<213> unknown

<220>
<223> Magainin frog

<400> 80

Gly Ile Gly Lys Phe Leu His Ser Ala Lys Lys Phe Gly Lys Ala Phe
1 5 10 15

Val Gly Glu Ile Met Asn Ser
20

<210> 81

1923534_1

<211> 25
<212> PRT
<213> unknown

<220>
<223> Pleurocidin fish

<400> 81

Gly Trp Gly Ser Phe Phe Lys Lys Ala Ala His Val Gly Lys His Val
1 5 10 15

Gly Lys Ala Ala Leu Thr His Tyr Leu
20 25

<210> 82
<211> 36
<212> PRT
<213> Aedes aegypti

<400> 82

Gly Gly Leu Lys Lys Leu Gly Lys Lys Leu Glu Gly Ala Gly Lys Arg
1 5 10 15

Val Phe Asn Ala Ala Glu Lys Ala Leu Pro Val Val Ala Gly Ala Lys
20 25 30

Ala Leu Arg Lys
35

<210> 83
<211> 40
<212> PRT
<213> Drosophila melanogaster

<400> 83

Gly Trp Leu Lys Lys Ile Gly Lys Lys Ile Glu Arg Val Gly Gln His
1 5 10 15

Thr Arg Asp Ala Thr Ile Gln Gly Leu Gly Ile Pro Gln Gln Ala Ala
20 25 30

Asn Val Ala Ala Thr Ala Arg Gly
35 40

<210> 84
<211> 21
<212> PRT
<213> unknown

<220>
<223> Buforin II vertebrate

<400> 84

Thr Arg Ser Ser Arg Ala Gly Leu Gln Phe Pro Val Gly Arg Val His
1 5 10 15

1923534_1

Arg Leu Leu Arg Lys
20

<210> 85
<211> 39
<212> PRT
<213> unknown

<220>
<223> Sarcotoxin IA Fly
<400> 85

Gly Trp Leu Lys Lys Ile Gly Lys Lys Ile Glu Arg Val Gly Gln His
1 5 10 15

Thr Arg Asp Ala Thr Ile Gln Gly Leu Gly Ile Ala Gln Gln Ala Ala
20 25 30

Asn Val Ala Ala Thr Ala Arg
35

<210> 86
<211> 17
<212> PRT
<213> Apis mellifera
<400> 86

Ala Asn Arg Pro Val Tyr Ile Pro Pro Pro Arg Pro Pro His Pro Arg
1 5 10 15

Leu

<210> 87
<211> 24
<212> PRT
<213> unknown

<220>
<223> Ascaphine 5 Frog
<400> 87

Gly Ile Lys Asp Trp Ile Lys Gly Ala Ala Lys Lys Leu Ile Lys Thr
1 5 10 15

Val Ala Ser His Ile Ala Asn Gln
20

<210> 88
<211> 22
<212> PRT
<213> unknown

<220>
<223> Nigrocine 2 Frog

1923534_1

<400> 88

Gly Leu Leu Ser Lys Val Leu Gly Val Gly Lys Lys Val Leu Cys Gly
1 5 10 15

Val Ser Gly Leu Val Cys
20

<210> 89

<211> 24

<212> PRT

<213> unknown

<220>

<223> Pseudin 1 Rana Frog

<400> 89

Gly Leu Asn Thr Leu Lys Lys Val Phe Gln Gly Leu His Glu Ala Ile
1 5 10 15

Lys Leu Ile Asn Asn His Val Gln
20

<210> 90

<211> 18

<212> PRT

<213> unknown

<220>

<223> Ranalexin Frog

<400> 90

Phe Leu Gly Gly Leu Ile Val Pro Ala Met Ile Cys Ala Val Thr Lys
1 5 10 15

Lys Cys

<210> 91

<211> 26

<212> PRT

<213> unknown

<220>

<223> Melittin bee

<400> 91

Gly Ile Gly Ala Val Leu Lys Val Leu Thr Thr Gly Leu Pro Ala Leu
1 5 10 15

Ile Ser Trp Ile Lys Arg Lys Arg Gln Gln
20 25

<210> 92

<211> 25

<212> PRT

<213> unknown

1923534_1

<220>

<223> Lycotoxin 1 Spider

<400> 92

Ile Trp Leu Thr Ala Leu Lys Phe Leu Gly Lys His Ala Ala Lys Lys
1 5 10 15

Leu Ala Lys Gln Gln Leu Ser Lys Leu
20 25

<210> 93

<211> 19

<212> PRT

<213> unknown

<220>

<223> Parasin 1 Fish

<400> 93

Lys Gly Arg Gly Lys Gln Gly Gly Lys Val Arg Ala Lys Ala Lys Thr
1 5 10 15

Arg Ser Ser

<210> 94

<211> 39

<212> PRT

<213> unknown

<220>

<223> Buforin I Toad

<400> 94

Ala Gly Arg Gly Lys Gln Gly Gly Lys Val Arg Ala Lys Ala Lys Thr
1 5 10 15

Arg Ser Ser Arg Ala Gly Leu Gln Phe Pro Val Gly Arg Val His Arg
20 25 30

Leu Leu Arg Lys Gly Asn Tyr
35

<210> 95

<211> 34

<212> PRT

<213> unknown

<220>

<223> Dermaseptin 1 Frog

<400> 95

Ala Leu Trp Lys Thr Met Leu Lys Lys Leu Gly Thr Met Ala Leu His
1 5 10 15

Ala Gly Lys Ala Ala Leu Gly Ala Ala Ala Asp Thr Ile Ser Gln Gly
 20 25 30 1923534_1

Thr Gln

<210> 96
 <211> 12
 <212> PRT
 <213> unknown

<220>
 <223> Bactenecin 1 Cow

<400> 96

Arg Leu Cys Arg Ile Val Val Ile Arg Val Cys Arg
 1 5 10

<210> 97
 <211> 21
 <212> PRT
 <213> unknown

<220>
 <223> Thanatin Insect

<400> 97

Gly Ser Lys Lys Pro Val Pro Ile Ile Tyr Cys Asn Arg Arg Thr Gly
 1 5 10 15

Lys Cys Gln Arg Met
 20

<210> 98
 <211> 19
 <212> PRT
 <213> unknown

<220>
 <223> Brevinin 1T Rana frogs

<400> 98

Val Asn Pro Ile Ile Leu Gly Val Leu Pro Lys Val Cys Leu Ile Thr
 1 5 10 15

Lys Lys Cys

<210> 99
 <211> 26
 <212> PRT
 <213> unknown

<220>
 <223> Ranateurin 1 Rana frog

<400> 99

1923534_1

Ser Met Leu Ser Val Leu Lys Asn Leu Gly Lys Val Gly Leu Gly Phe
1 5 10 15

Val Ala Cys Lys Ile Asn Ile Lys Gln Cys
20 25

<210> 100
<211> 46
<212> PRT
<213> unknown

<220>
<223> Esculentin 1 Rana frogs

<400> 100

Gly Ile Phe Ser Lys Leu Gly Arg Lys Lys Ile Lys Asn Leu Leu Ile
1 5 10 15

Ser Gly Leu Lys Asn Val Gly Lys Glu Val Gly Met Asp Val Val Arg
20 25 30

Thr Gly Ile Lys Ile Ala Gly Cys Lys Ile Lys Gly Glu Cys
35 40 45

<210> 101
<211> 17
<212> PRT
<213> Limulus polyphemus

<400> 101

Arg Trp Cys Phe Arg Val Cys Tyr Arg Gly Ile Cys Tyr Arg Lys Cys
1 5 10 15

Arg

<210> 102
<211> 25
<212> PRT
<213> unknown

<220>
<223> Androctonin Scorpion

<400> 102

Arg Ser Val Cys Arg Gln Ile Lys Ile Cys Arg Arg Arg Gly Gly Cys
1 5 10 15

Tyr Tyr Lys Cys Thr Asn Arg Pro Tyr
20 25

<210> 103
<211> 30
<212> PRT
<213> Homo sapiens

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<400> 103

Asp Cys Tyr Cys Arg Ile Pro Ala Cys Ile Ala Gly Glu Arg Arg Tyr
1 5 10 15

Gly Thr Cys Ile Tyr Gln Gly Arg Leu Trp Ala Phe Cys Cys
20 25 30

<210> 104

<211> 38

<212> PRT

<213> unknown

<220>

<223> beta-defensin cow

<400> 104

Asn Pro Val Ser Cys Val Arg Asn Lys Gly Ile Cys Val Pro Ile Arg
1 5 10 15

Cys Pro Gly Ser Met Lys Gln Ile Gly Thr Cys Val Gly Arg Ala Val
20 25 30

Lys Cys Cys Arg Lys Lys
35

<210> 105

<211> 18

<212> PRT

<213> unknown

<220>

<223> theta-defensin monkey

<400> 105

Gly Phe Cys Arg Cys Leu Cys Arg Arg Gly Val Cys Arg Cys Ile Cys
1 5 10 15

Thr Arg

<210> 106

<211> 40

<212> PRT

<213> unknown

<220>

<223> defensin (sapecin A) insect

<400> 106

Ala Thr Cys Asp Leu Leu Ser Gly Thr Gly Ile Asn His Ser Ala Cys
1 5 10 15

Ala Ala His Cys Leu Leu Arg Gly Asn Arg Gly Gly Tyr Cys Asn Gly
20 25 30

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Lys Ala Val Cys Val Cys Arg Asn
35 40

<210> 107
<211> 46
<212> PRT
<213> unknown

<220>
<223> Thionin (crambin) plant
<400> 107

Thr Thr Cys Cys Pro Ser Ile Val Ala Arg Ser Asn Phe Asn Val Cys
1 5 10 15

Arg Ile Pro Gly Thr Pro Glu Ala Ile Cys Ala Thr Tyr Thr Gly Cys
20 25 30

Ile Ile Ile Pro Gly Ala Thr Cys Pro Gly Asp Tyr Ala Asn
35 40 45

<210> 108
<211> 50
<212> PRT
<213> unknown

<220>
<223> defensin from radish
<400> 108

Gln Lys Leu Cys Gln Arg Pro Ser Gly Thr Trp Ser Gly Val Cys Gly
1 5 10 15

Asn Asn Asn Ala Cys Lys Asn Gln Cys Ile Arg Leu Glu Lys Ala Arg
20 25 30

His Gly Ser Cys Asn Tyr Val Phe Pro Ala His Cys Ile Cys Tyr Phe
35 40 45

Pro Cys
50

<210> 109
<211> 44
<212> PRT
<213> Drosophila melanogaster

<400> 109

Asp Cys Leu Ser Gly Arg Tyr Lys Gly Pro Cys Ala Val Trp Asp Asn
1 5 10 15

Glu Thr Cys Arg Arg Val Cys Lys Glu Glu Gly Arg Ser Ser Gly His
20 25 30

Cys Ser Pro Ser Leu Lys Cys Trp Cys Glu Gly Cys

35

40

<210> 110
 <211> 25
 <212> PRT
 <213> Homo sapiens

<400> 110

Asp Thr His Phe Pro Ile Cys Ile Phe Cys Cys Gly Cys Cys His Arg
 1 5 10 15

Ser Lys Cys Gly Met Cys Cys Lys Thr
 20 25

<210> 111
 <211> 44
 <212> PRT
 <213> unknown

<220>
 <223> Bac 5 Cow

<400> 111

Arg Phe Arg Pro Pro Ile Arg Arg Pro Pro Ile Arg Pro Pro Phe Tyr
 1 5 10 15

Pro Pro Phe Arg Pro Pro Ile Arg Pro Pro Ile Phe Pro Pro Ile Arg
 20 25 30

Pro Pro Phe Arg Pro Pro Leu Gly Arg Pro Phe Pro
 35 40

<210> 112
 <211> 39
 <212> PRT
 <213> unknown

<220>
 <223> PR-39 Pig

<400> 112

Arg Arg Arg Pro Arg Pro Pro Tyr Leu Pro Arg Pro Arg Pro Pro Pro
 1 5 10 15

Phe Phe Pro Pro Arg Leu Pro Pro Arg Ile Pro Pro Gly Phe Pro Pro
 20 25 30

Arg Phe Pro Pro Arg Phe Pro
 35

<210> 113
 <211> 20
 <212> PRT
 <213> unknown

<220>

<223> Pyrrhocoricin Insect

<400> 113

Val Asp Lys Gly Ser Tyr Leu Pro Arg Pro Thr Pro Pro Arg Pro Ile
1 5 10 15

Tyr Asn Arg Asn
20

<210> 114

<211> 24

<212> PRT

<213> Homo sapiens

<400> 114

Asp Ser His Ala Lys Arg His His Gly Tyr Lys Arg Lys Phe His Glu
1 5 10 15

Lys His His Ser His Arg Gly Tyr
20

<210> 115

<211> 34

<212> PRT

<213> Limulus polyphemus

<400> 115

Gly Phe Lys Leu Lys Gly Met Ala Arg Ile Ser Cys Leu Pro Asn Gly
1 5 10 15

Gln Trp Ser Asn Phe Pro Pro Lys Cys Ile Arg Glu Cys Ala Met Val
20 25 30

Ser Ser

<210> 116

<211> 18

<212> PRT

<213> artificial

<220>

<223> synthetic sequence

<400> 116

Gly Phe Phe Ile Pro Ala Val Ile Leu Pro Ser Ile Ala Phe Leu Ile
1 5 10 15

Val Pro

<210> 117

<211> 5

<212> PRT

<213> artificial

<220>
 <223> synthetic sequence

<400> 117

Phe Phe Val Ala Pro
 1 5

<210> 118
 <211> 13
 <212> PRT
 <213> unknown

<220>
 <223> alpha4-helix of T4 lysozyme

<400> 118

Pro Asn Arg Ala Lys Arg Val Ile Thr Thr Phe Arg Thr
 1 5 10

<210> 119
 <211> 27
 <212> PRT
 <213> artificial

<220>
 <223> synthetic sequence

<400> 119

Lys Arg Trp Val Lys Arg Val Lys Arg Val Lys Arg Trp Val Lys Arg
 1 5 10 15

Val Val Arg Val Val Lys Arg Trp Val Lys Arg
 20 25

<210> 120
 <211> 25
 <212> PRT
 <213> artificial

<220>
 <223> synthetic sequence

<400> 120

Gly Lys Pro Gly Trp Leu Ile Lys Lys Ala Leu Val Phe Lys Lys Leu
 1 5 10 15

Ile Arg Arg Pro Leu Lys Arg Leu Ala
 20 25

<210> 121
 <211> 291
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with C14S and C50S plus SMAP-29

<400> 121

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
100 105 110

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
245 250 255

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
260 265 270

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Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
275 280 285

His Arg Lys
290

<210> 122
<211> 291
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with T82I, A206V and S232 plus SMAP-29

<400> 122

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
65 70 75 80

Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
100 105 110

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
180 185 190

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Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
 225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 245 250 255

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 275 280 285

His Arg Lys
 290

<210> 123
 <211> 291
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with T82I, A206V, S232T, I122M and A160T plus
 SMAP-29

<400> 123

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
 1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
 20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
 35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 65 70 75 80

Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 100 105 110

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val

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115

120

125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
 180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
 225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 245 250 255

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 275 280 285

His Arg Lys
 290

<210> 124
 <211> 291
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with C14S, C50S, I122M and A160T plus SMAP-29

<400> 124

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
 1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
 20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
 35 40 45

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Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
100 105 110

Thr Ala Asn Lys Ser Arg Ala Ala Thr Pro Val Met Asn Ala Val
115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
245 250 255

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
275 280 285

His Arg Lys
290

<210> 125
<211> 291
<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with C14S, C23S and C50S plus SMAP-29

<400> 125

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
35 40 45

Thr Leu Leu Asn Leu Ser Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
100 105 110

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 275 280 285

His Arg Lys
 290

<210> 126
 <211> 291
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with T82I, A206V, S232T, I122M, A160T, C14S and
 C50S plus SMAP-29

<400> 126

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
 1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
 20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
 35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 100 105 110

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 165 170 175

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Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
245 250 255

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
275 280 285

His Arg Lys
290

<210> 127
<211> 291
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with T82I, A206N, S232T, I122M, A160T, C14S and
C50S plus SMAP-29

<400> 127

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
85 90 95

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Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 100 105 110

Ile Ala Asn Lys Ser Arg Ala Ala Thr Pro Val Met Asn Ala Val
 115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
 180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Asn Ala Arg Arg
 225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 245 250 255

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 275 280 285

His Arg Lys
 290

<210> 128

<211> 290

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with C14S and C50S plus SMAP-29 without Met

<400> 128

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
 1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys

20

25

30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
 35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
 50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
 65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
 85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Thr
 100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
 115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
 130 135 140

Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala Thr
 145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
 165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu Arg
 180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
 195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
 210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg Phe
 225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
 245 250 255

Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
 260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
 275 280 285

Arg Lys

290

<210> 129
 <211> 290
 <212> PRT
 <213> artificial sequence
 <220>
 <223> mutated KZ144 with T82I, A206V and S232 plus SMAP-29 without Met
 <400> 129

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
 1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
 20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln Thr
 35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
 50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Cys
 65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
 85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Ile
 100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
 115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
 130 135 140

Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala Thr
 145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
 165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu Arg
 180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
 195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
 210 215 220

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Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg Phe
225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
245 250 255

Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
275 280 285

Arg Lys
290

<210> 130

<211> 290

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with T82I, A206V, S232T, I122M and A160T plus
SMAP-29 without Met

<400> 130

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln Thr
35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Cys
65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Ile
100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
130 135 140

1923534_1

Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala Thr
145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu Arg
180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg Phe
225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
245 250 255

Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
275 280 285

Arg Lys
290

<210> 131
<211> 290
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with C14S, C50S, I122M and A160T plus SMAP-29
without Met

<400> 131

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser

[illegible]

<210>	132
<211>	290
<212>	PRT
<213>	artificial sequence
<220>	
<223>	mutated KZ144 with C14S, C23S and C50S plus SMAP-29 w/o Met
<400>	132

1923534_1

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
 1 5 10 15
 Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
 20 25 30
 Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
 35 40 45
 Leu Leu Asn Leu Ser Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
 50 55 60
 Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
 65 70 75 80
 Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
 85 90 95
 Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Thr
 100 105 110
 Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
 115 120 125
 Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
 130 135 140
 Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala Thr
 145 150 155 160
 Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
 165 170 175
 Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu Arg
 180 185 190
 Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
 195 200 205
 Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
 210 215 220
 Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg Phe
 225 230 235 240
 Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
 245 250 255
 Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
 260 265 270

1923534_1

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
 275 280 285

Arg Lys
 290

<210> 133
 <211> 290
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with T82I, A206V, S232T, I122M, A160T, C14S and C50S plus SMAP-29 without Met

<400> 133

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
 1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
 20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
 35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
 50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
 65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
 85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Ile
 100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
 115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
 130 135 140

Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala Thr
 145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
 165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu Arg
 180 185 190

1923534_1

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
 195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
 210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg Phe
 225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
 245 250 255

Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
 260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
 275 280 285

Arg Lys
 290

<210> 134
 <211> 290
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with T82I, A206N, S232T, I122M, A160T, C14S and
 C50S plus SMAP-29 without Met

<400> 134

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
 1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
 20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
 35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
 50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
 65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
 85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Ile
 100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
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115

120

125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
 130 135 140

Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala Thr
 145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
 165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu Arg
 180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
 195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
 210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Asn Ala Arg Arg Phe
 225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
 245 250 255

Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
 260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
 275 280 285

Arg Lys
 290

<210> 135
 <211> 6
 <212> PRT
 <213> artificial sequence

<220>
 <223> His-Tag (6x)

<400> 135

His His His His His His
 1 5

<210> 136
 <211> 299
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with C14S and C50S plus SMAP-29 and HisTag

1923534_1

<400> 136

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
100 105 110

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
245 250 255

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
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	260		265		270
Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala 275 280 285					
His Arg Lys Leu Glu His His His His His His 290 295					
<210>	137				
<211>	299				
<212>	PRT				
<213>	artificial sequence				
<220>					
<223>	mutated KZ144 with T82I, A206V and S232 plus SMAP-29 and Histag				
<400>	137				
Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys 1 5 10 15					
Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser 20 25 30					
Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln 35 40 45					
Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile 50 55 60					
Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn 65 70 75 80					
Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu 85 90 95					
Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro 100 105 110					
Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val 115 120 125					
Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser 130 135 140					
Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala 145 150 155 160					
Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu 165 170 175					
Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu 180 185 190					

1923534_1

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
245 250 255

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
275 280 285

His Arg Lys Leu Glu His His His His His
290 295

<210> 138
<211> 299
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with T82I, A206V, S232T, I122M and A160Tplus
SMAP-29 and HisTag

<400> 138

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
65 70 75 80

Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
100 105 110

1923534_1

Ile Ala Asn Lys Ser Arg Ala Ala Thr Pro Val Met Asn Ala Val
115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
245 250 255

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
275 280 285

His Arg Lys Leu Glu His His His His His His
290 295

<210> 139

<211> 299

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with C14S, C50S, I122M and A160Tplus SMAP-29 and HisTag

<400> 139

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
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35

40

45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 50 55 60
 Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 65 70 75 80
 Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 85 90 95
 Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 100 105 110
 Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 115 120 125
 Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 130 135 140
 Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 145 150 155 160
 Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 165 170 175
 Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
 180 185 190
 Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 195 200 205
 Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 210 215 220
 Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
 225 230 235 240
 Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 245 250 255
 Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 260 265 270
 Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 275 280 285
 His Arg Lys Leu Glu His His His His His
 290 295

<210> 140

1923534_1

<211> 299
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with C14S, C23S and C50Splus SMAP-29 and HisTag

<400> 140

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
 1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
 20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
 35 40 45

Thr Leu Leu Asn Leu Ser Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 100 105 110

Thr Ala Asn Lys Ser Arg Ala Ala Thr Pro Val Met Asn Ala Val
 115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
 145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu
 180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg
 225 230 235 240

1923534_1

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
245 250 255

Glu Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro
260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
275 280 285

His Arg Lys Leu Glu His His His His His
290 295

<210> 141

<211> 299

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with T82I, A206V, S232T, I122M, A160T, C14S and C50Splus SMAP-29 and HisTag

<400> 141

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
85 90 95

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
100 105 110

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
145 150 155 160

1923534_1
 Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
 180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg
 225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 245 250 255

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 275 280 285

His Arg Lys Leu Glu His His His His His His
 290 295

<210> 142
 <211> 299
 <212> PRT
 <213> artificial sequence

<220>
 <223> mutated KZ144 with T82I, A206N, S232T, I122M, A160T, C14S and
 C50Splus SMAP-29 and HisTag

<400> 142

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
 1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
 20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln
 35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 65 70 75 80

Ser Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
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Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro
 100 105 110

Ile Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val
 115 120 125

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 130 135 140

Ile Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala
 145 150 155 160

Thr Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu
 165 170 175

Asn Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu
 180 185 190

Arg Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys
 195 200 205

Glu Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp
 210 215 220

Thr Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Asn Ala Arg Arg
 225 230 235 240

Phe Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys
 245 250 255

Glu Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro
 260 265 270

Lys Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala
 275 280 285

His Arg Lys Leu Glu His His His His His
 290 295

<210> 143

<211> 298

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with C14S and C50S plus SMAP-29 and HisTag, w/o Met

<400> 143

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
 1 5 10 15

1923534_1

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
 20 25 30
 Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
 35 40 45
 Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
 50 55 60
 Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
 65 70 75 80
 Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
 85 90 95
 Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Thr
 100 105 110
 Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
 115 120 125
 Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
 130 135 140
 Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala Thr
 145 150 155 160
 Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
 165 170 175
 Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu Arg
 180 185 190
 Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
 195 200 205
 Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
 210 215 220
 Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg Phe
 225 230 235 240
 Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
 245 250 255
 Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
 260 265 270
 Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
 275 280 285

1923534_1

Arg Lys Leu Glu His His His His His His
290 295

<210> 144
<211> 298
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with T82I, A206V and S232 plus SMAP-29 and HisTag,
w/o Met

<400> 144

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln Thr
35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Cys
65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Ile
100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
130 135 140

Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala Thr
145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu Arg
180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
195 200 205

1923534_1

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg Phe
225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
245 250 255

Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
275 280 285

Arg Lys Leu Glu His His His His His His
290 295

<210> 145
<211> 298
<212> PRT
<213> artificial sequence

<220>
<223> mutated KZ144 with T82I, A206V, S232T, I122M and A160Tplus
SMAP-29 and HisTag, w/o Met

<400> 145

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln Thr
35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Cys
65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Ile
100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
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140

130

135

Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala Thr
145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu Arg
180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg Phe
225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
245 250 255

Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
275 280 285

Arg Lys Leu Glu His His His His His His
290 295

<210> 146

<211> 298

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with C14S, C50S, I122M and A160Tplus SMAP-29 and HisTag, w/o Met

<400> 146

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
50 55 60

1923534_1

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Thr
100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
130 135 140

Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala Thr
145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu Arg
180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg Phe
225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
245 250 255

Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
275 280 285

Arg Lys Leu Glu His His His His His His
290 295

<210> 147
<211> 298
<212> PRT
<213> artificial sequence

<220>

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<223> mutated KZ144 with C14S, C23S and C50Splus SMAP-29 and Histag,
w/o Met

<400> 147

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
35 40 45

Leu Leu Asn Leu Ser Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Thr
100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
130 135 140

Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala Thr
145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu Arg
180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg Phe
225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
245 250 255

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Ala Gln Ala Asn Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
 260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
 275 280 285

Arg Lys Leu Glu His His His His His His
 290 295

<210> 148

<211> 298

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with T82I, A206V, S232T, I122M, A160T, C14S and
 C50Splus SMAP-29 and HisTag, w/o Met

<400> 148

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
 1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
 20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
 35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
 50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
 65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
 85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Ile
 100 105 110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
 115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
 130 135 140

Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala Thr
 145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
 165 170 175

1923534_1

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu Arg
180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Val Ala Arg Arg Phe
225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
245 250 255

Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
275 280 285

Arg Lys Leu Glu His His His His His His
290 295

<210> 149

<211> 298

<212> PRT

<213> artificial sequence

<220>

<223> mutated KZ144 with T82I, A206N, S232T, I122M, A160T, C14S and C50S plus SMAP-29 and HisTag, w/o Met

<400> 149

Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys Lys
1 5 10 15

Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser Lys
20 25 30

Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Ser Gln Leu Gln Thr
35 40 45

Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile Phe
50 55 60

Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn Ser
65 70 75 80

Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu Phe
85 90 95

Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Met Pro Ile
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100

105

110

Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu
 115 120 125

Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile
 130 135 140

Glu Ser Ala Phe Asp Tyr Glu Met Lys Ala Lys Thr Ser Ser Ala Thr
 145 150 155 160

Gly Trp Phe Gln Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn
 165 170 175

Tyr Gly Met Lys Tyr Gly Val Leu Thr Asp Pro Thr Gly Thr Leu Arg
 180 185 190

Lys Asp Pro Arg Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu
 195 200 205

Asn Met Asn Ile Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr
 210 215 220

Asp Leu Tyr Leu Ala His Phe Phe Gly Pro Gly Asn Ala Arg Arg Phe
 225 230 235 240

Leu Thr Thr Gly Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu
 245 250 255

Ala Gln Ala Asn Pro Thr Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys
 260 265 270

Thr Ile Gln Glu Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His
 275 280 285

Arg Lys Leu Glu His His His His His His
 290 295

<210> 150

<211> 190

<212> PRT

<213> Artificial Sequence

<220>

<223> KZ144 fragment 71-260 with Y75A

<400> 150

Pro Pro Ile Pro Ala Lys Thr Ile Pro Met Pro Thr Ala Asn Lys Ser
 1 5 10 15

Arg Ala Ala Ala Thr Pro Val Met Asn Ala Val Glu Asn Ala Thr Gly
 20 25 30

1923534_1

Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser Ile Glu Ser Ala Phe
35 40 45

Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala Thr Gly Trp Phe Gln
50 55 60

Phe Leu Thr Gly Thr Trp Lys Thr Met Ile Glu Asn Tyr Gly Met Lys
65 70 75 80

Tyr Gly Val Leu Thr Asp Pro Thr Gly Ala Leu Arg Lys Asp Pro Arg
85 90 95

Ile Ser Ala Leu Met Gly Ala Glu Leu Ile Lys Glu Asn Met Asn Ile
100 105 110

Leu Arg Pro Val Leu Lys Arg Glu Pro Thr Asp Thr Asp Leu Tyr Leu
115 120 125

Ala His Phe Phe Gly Pro Gly Ala Ala Arg Arg Phe Leu Thr Thr Gly
130 135 140

Gln Asn Glu Leu Ala Ala Thr His Phe Pro Lys Glu Ala Gln Ala Asn
145 150 155 160

Pro Ser Ile Phe Tyr Asn Lys Asp Gly Ser Pro Lys Thr Ile Gln Glu
165 170 175

Val Tyr Asn Leu Met Asp Gly Lys Val Ala Ala His Arg Lys
180 185 190

<210> 151
<211> 299
<212> PRT
<213> Artificial Sequence

<220>
<223> KZ144 plus SMAP-29 and HisTag

<400> 151

Met Arg Gly Leu Arg Arg Leu Gly Arg Lys Ile Ala His Gly Val Lys
1 5 10 15

Lys Tyr Gly Pro Thr Val Leu Arg Ile Ile Arg Ile Ala Gly Gly Ser
20 25 30

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
35 40 45

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
50 55 60

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
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65				70				75				80			
Cys	Leu	Asp	Ser	Asp ₈₅	Gly	Ile	Val	Gly	Lys ₉₀	Asn	Thr	Trp	Ala	Glu ₉₅	Leu
Phe	Ser	Lys	Tyr ₁₀₀	Ser	Pro	Pro	Ile	Pro ₁₀₅	Tyr	Lys	Thr	Ile	Pro ₁₁₀	Met	Pro
Thr	Ala	Asn ₁₁₅	Lys	Ser	Arg	Ala	Ala ₁₂₀	Ala	Thr	Pro	Val	Met ₁₂₅	Asn	Ala	Val
Glu	Asn ₁₃₀	Ala	Thr	Gly	Val	Arg ₁₃₅	Ser	Gln	Leu	Leu	Leu ₁₄₀	Thr	Phe	Ala	Ser
Ile ₁₄₅	Glu	Ser	Ala	Phe	Asp ₁₅₀	Tyr	Glu	Ile	Lys	Ala ₁₅₅	Lys	Thr	Ser	Ser	Ala ₁₆₀
Thr	Gly	Trp	Phe	Gln ₁₆₅	Phe	Leu	Thr	Gly	Thr ₁₇₀	Trp	Lys	Thr	Met	Ile ₁₇₅	Glu
Asn	Tyr	Gly	Met ₁₈₀	Lys	Tyr	Gly	Val	Leu ₁₈₅	Thr	Asp	Pro	Thr	Gly ₁₉₀	Ala	Leu
Arg	Lys	Asp ₁₉₅	Pro	Arg	Ile	Ser	Ala ₂₀₀	Leu	Met	Gly	Ala	Glu ₂₀₅	Leu	Ile	Lys
Glu	Asn ₂₁₀	Met	Asn	Ile	Leu	Arg ₂₁₅	Pro	Val	Leu	Lys	Arg ₂₂₀	Glu	Pro	Thr	Asp
Thr ₂₂₅	Asp	Leu	Tyr	Leu	Ala ₂₃₀	His	Phe	Phe	Gly	Pro ₂₃₅	Gly	Ala	Ala	Arg	Arg ₂₄₀
Phe	Leu	Thr	Thr	Gly ₂₄₅	Gln	Asn	Glu	Leu	Ala ₂₅₀	Ala	Thr	His	Phe	Pro ₂₅₅	Lys
Glu	Ala	Gln	Ala ₂₆₀	Asn	Pro	Ser	Ile	Phe ₂₆₅	Tyr	Asn	Lys	Asp	Gly ₂₇₀	Ser	Pro
Lys	Thr	Ile ₂₇₅	Gln	Glu	Val	Tyr	Asn ₂₈₀	Leu	Met	Asp	Gly	Lys ₂₈₅	Val	Ala	Ala
His	Arg ₂₉₀	Lys	Leu	Glu	His	His ₂₉₅	His	His	His	His	His	His	His	His	His
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<211>	256														
<212>	PRT														
<213>	Artificial sequence														
<220>															
<223>	KZ144 without N-terminal methionine, with selenomethionine instead of methionine residues														

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 <223> Xaa is selenomethionine

<220>
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 <222> (93)..(93)
 <223> Xaa is selenomethionine

<220>
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 <222> (142)..(142)
 <223> Xaa is selenomethionine

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 <222> (148)..(148)
 <223> Xaa is selenomethionine

<220>
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 <222> (170)..(170)
 <223> Xaa is selenomethionine

<220>
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 <222> (179)..(179)
 <223> Xaa is selenomethionine

<220>
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 <222> (250)..(250)
 <223> Xaa is selenomethionine

<400> 152

Lys Val Leu Arg Lys Gly Asp Arg Gly Asp Glu Val Cys Gln Leu Gln
 1 5 10 15

Thr Leu Leu Asn Leu Cys Gly Tyr Asp Val Gly Lys Pro Asp Gly Ile
 20 25 30

Phe Gly Asn Asn Thr Phe Asn Gln Val Val Lys Phe Gln Lys Asp Asn
 35 40 45

Cys Leu Asp Ser Asp Gly Ile Val Gly Lys Asn Thr Trp Ala Glu Leu
 50 55 60

Phe Ser Lys Tyr Ser Pro Pro Ile Pro Tyr Lys Thr Ile Pro Xaa Pro
 65 70 75 80

Thr Ala Asn Lys Ser Arg Ala Ala Ala Thr Pro Val Xaa Asn Ala Val
 85 90 95

Glu Asn Ala Thr Gly Val Arg Ser Gln Leu Leu Leu Thr Phe Ala Ser
 100 105 110

Ile Glu Ser Ala Phe Asp Tyr Glu Ile Lys Ala Lys Thr Ser Ser Ala
 115 120 125

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Thr	Gly	Trp	Phe	Gln	Phe	Leu	Thr	Gly	Thr	Trp	Lys	Thr	Xaa	Ile	Glu
	130					135					140				
Asn	Tyr	Gly	Xaa	Lys	Tyr	Gly	Val	Leu	Thr	Asp	Pro	Thr	Gly	Ala	Leu
145					150					155					160
Arg	Lys	Asp	Pro	Arg	Ile	Ser	Ala	Leu	Xaa	Gly	Ala	Glu	Leu	Ile	Lys
				165					170					175	
Glu	Asn	Xaa	Asn	Ile	Leu	Arg	Pro	Val	Leu	Lys	Arg	Glu	Pro	Thr	Asp
			180					185					190		
Thr	Asp	Leu	Tyr	Leu	Ala	His	Phe	Phe	Gly	Pro	Gly	Ala	Ala	Arg	Arg
		195					200					205			
Phe	Leu	Thr	Thr	Gly	Gln	Asn	Glu	Leu	Ala	Ala	Thr	His	Phe	Pro	Lys
	210					215					220				
Glu	Ala	Gln	Ala	Asn	Pro	Ser	Ile	Phe	Tyr	Asn	Lys	Asp	Gly	Ser	Pro
225					230					235					240
Lys	Thr	Ile	Gln	Glu	Val	Tyr	Asn	Leu	Xaa	Asn	Ile	Leu	Arg	Pro	Val
				245					250					255	